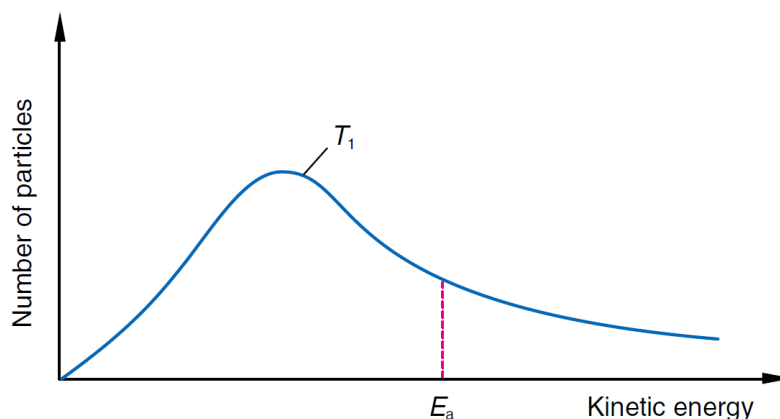
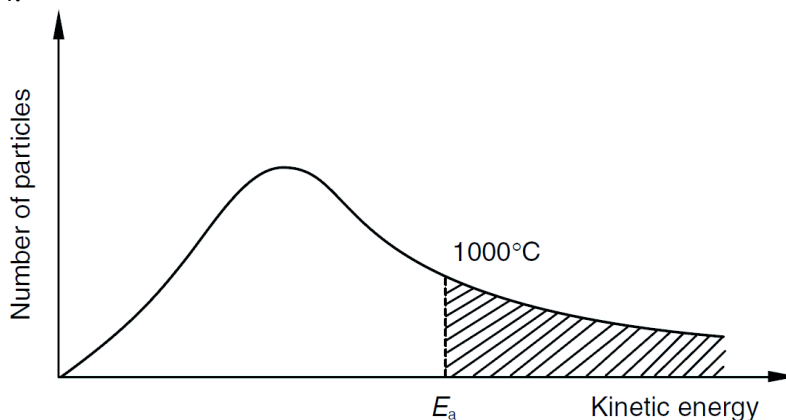


Quiz (Maxwell-Boltzmann Distribution Curve)

1. In the diagram below,



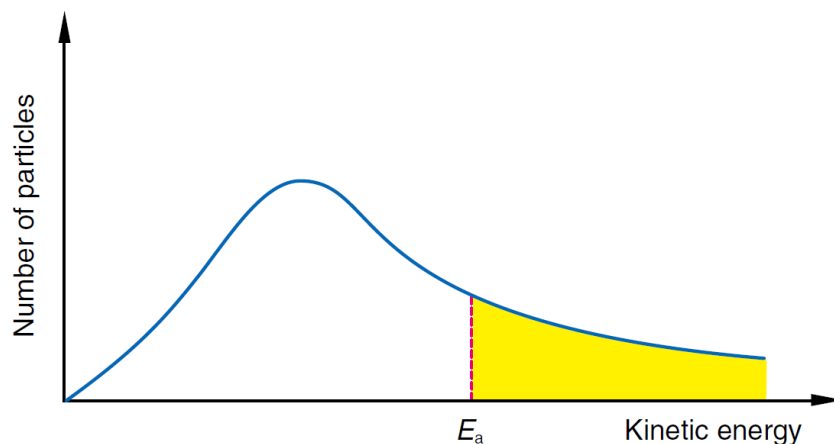
- mark the part which represents the number of particles having kinetic energy equal to or greater than the activation energy, E_a .
 - sketch the Maxwell-Boltzmann distribution curve at a temperature lower than T_1 as shown. Label the curve as T_2 .
 - state ONE characteristic feature of the curve for T_2 when compared with that for T_1 .
2. The Maxwell-Boltzmann distribution curve of a chemical system at $1000\text{ }^\circ\text{C}$ is shown in the following diagram. The shaded region indicates the number of particles having energy equal to or greater than the activation energy, E_a , of the reaction.



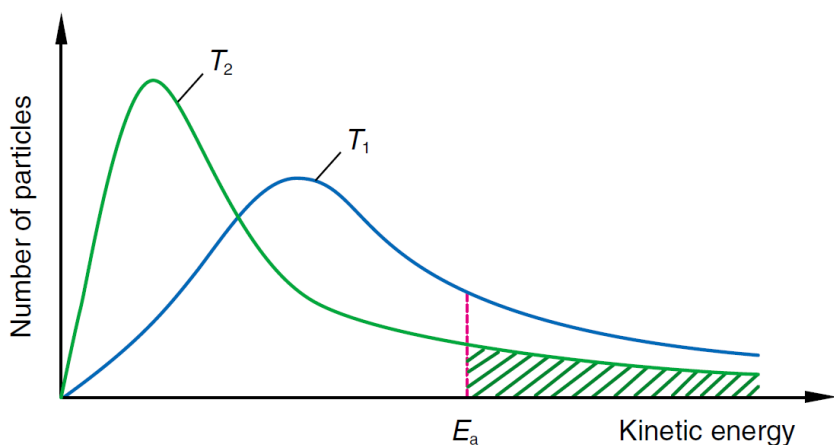
- In the above diagram, sketch another distribution curve representing the same system at $500\text{ }^\circ\text{C}$.
- Shade the region showing the number of particles with energy equal to or greater than E_a at $500\text{ }^\circ\text{C}$.
- Based on your answer in (b), explain why the reaction rate is lower at a lower temperature.

Suggested Answer

1. (a)

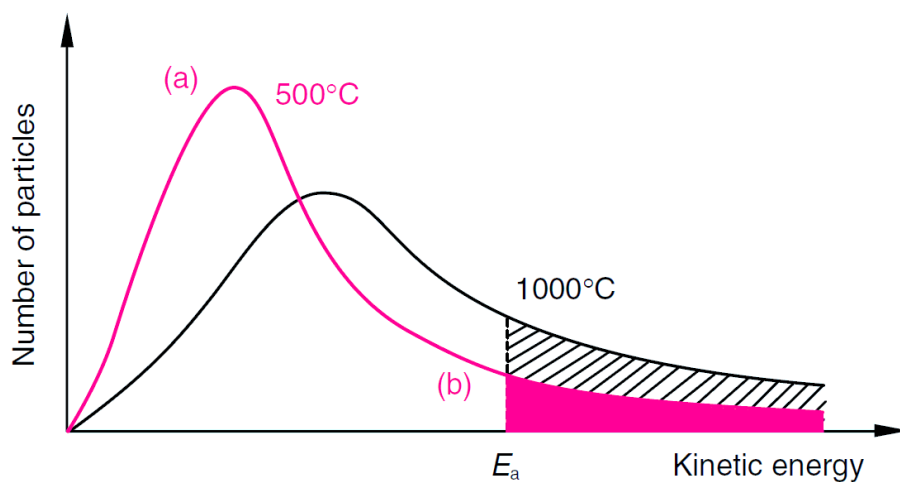


(b)



(c) The average kinetic energy is lower as shown by the curve for T_2 when compared with that for T_1 .

2. (a) (b)



(c) At a lower temperature, the average kinetic energy of the particles is lower. There are less particles having energy equal to or greater than the activation energy. Consequently, the number of effective collisions per unit time decreases, so the reaction rate is lower.